







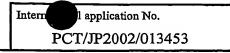
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference W0793-00	FOR FURTHER ACT		ation of Transmittal of International Examination Report (Form PCT/IPEA/416)
International application No.	International filing date	(day/month/year)	Priority date (day/month/year)
PCT/JP2002/013453	24 December 2002	2 (24.12.2002)	27 December 2001 (27.12.2001)
International Patent Classification (IPC) or n . H01M 8/02, 8/10	ational classification and	IPC	
Applicant HI	TACHI CHEMICAL	COMPANY, LI	TD.
This international preliminary exam and is transmitted to the applicant a	ination report has been pr ccording to Article 36.	epared by this Intern	ational Preliminary Examining Authority
2. This REPORT consists of a total of	12 sheets, in	ncluding this cover s	heet.
amended and are the basis for 70.16 and Section 607 of the	or this report and/or sheets Administrative Instruction	containing rectifications under the PCT).	on, claims and/or drawings which have been tions made before this Authority (see Rule
These annexes consist of a to	otal ofsh	neets.	
 This report contains indications related 	ating to the following item	ıs:	
I Basis of the report			
II Priority			
III Non-establishment	of opinion with regard to	novelty, inventive st	ep and industrial applicability
IV Lack of unity of in	vention		
V Reasoned statemen	at under Article 35(2) with nations supporting such st	regard to novelty, ir	ventive step or industrial applicability;
Certain documents			
VII Certain defects in t	he international application	on	
' <u>"</u> 🗀	ns on the international app		
, <u></u>			
Date of submission of the demand		Date of completion	of this report
19 May 2003 (19.05.		_	ebruary 2004 (12.02.2004)
	<i>'</i>		
Name and mailing address of the IPEA/JP		Authorized officer	
Facsimile No.		Telephone No.	





I. J	Basis	of the re	port
1.	With	regard to	the elements of the international application:*
	\boxtimes	the inter	rnational application as originally filed
	Ħ	the desc	eription:
			, as originally filed
		pages	, filed with the demand
l		pages	, filed with the letter of
	$\overline{}$	the clair	
	ш		as originally filed
l		pages .	, as amended (together with any statement under Article 19
l		pages .	, filed with the demand
ŀ		pages	, filed with the letter of
	Ш	the drav	and almost a first
		-	, as originally filed
		pages	, filed with the demand
	_	pages	, filed with the letter of
	L t	he seque	nce listing part of the description:
		pages	, as originally filed
		pages	, filed with the demand
		pages :	, filed with the letter of
2.	the in	nternation	o the language, all the elements marked above were available or furnished to this Authority in the language in which nal application was filed, unless otherwise indicated under this item. ts were available or furnished to this Authority in the following language which is:
		the lang	guage of a translation furnished for the purposes of international search (under Rule 23.1(b)).
		the lang	guage of publication of the international application (under Rule 48.3(b)).
		the lan	guage of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/).
3.	With preli	n regard minary ex	to any nucleotide and/or amino acid sequence disclosed in the international application, the international xamination was carried out on the basis of the sequence listing:
1		contain	ned in the international application in written form.
		filed to	gether with the international application in computer readable form.
l		furnish	ed subsequently to this Authority in written form.
		furnish	ed subsequently to this Authority in computer readable form.
			atement that the subsequently furnished written sequence listing does not go beyond the disclosure in the tional application as filed has been furnished.
			atement that the information recorded in computer readable form is identical to the written sequence listing has arnished.
4.		The am	nendments have resulted in the cancellation of:
			the description, pages
		===	the claims, Nos.
İ			the drawings, sheets/fig
5.			oort has been established as if (some of) the amendments had not been made, since they have been considered to go the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**
1	in thi	icement s is report 10.17).	sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16
		•	ent sheet containing such amendments must be referred to under item 1 and annexed to this report.

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Ì	Internal application No.
	PCT/JP2002/013453

IV. Lack of unity of invention
1. In response to the invitation to restrict or pay additional fees the applicant has:
restricted the claims.
paid additional fees.
paid additional fees under protest.
neither restricted nor paid additional fees.
This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
complied with.
not complied with for the following reasons:
See supplemental sheet
,
·
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
all parts.
the parts relating to claims Nos.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV. 3.

For a group of inventions set forth in the claims to fulfill the requirement of unity of invention, there must be a special technical feature linking the group of inventions so as to form a single general inventive concept, but it is clear that in the inventions set forth in claims 1-15, no common special technical feature exists between a fuel cell separator with outstanding integrity of assembly of a fuel cell stack having the constitution of claims 1-7, 9-15 and a fuel cell separator that is not likely to result in a deterioration of cell characteristics after an extended time of operation having the constitution of claim 8.

Therefore, among the group of inventions set forth in claims 1-15, there is no special technical feature linking the group of inventions so as to form a single general inventive concept. It is therefore clear that the group of inventions set forth in claims 1-15 does not fulfill the requirement of unity of invention.

Next, the number of inventions, that is, the number of inventions described in the claims of this international application and linked so as to form a general inventive concept will be examined.

Although claims 1-3, 7, 9-15, claims 4-5 and claim 6 are linked in terms of a fuel cell separator with outstanding integrity of assembly of a fuel cell stack, their technical features are mutually different ones, that is, flexural/fracture distortion, compressive modulus of elasticity and Shore hardness within specified ranges. In addition, since this feature is disclosed in prior art documents, such as document 1 (JP 8-222241 A (Tokai Carbon Co., Ltd.), 30 August 1996, Table 2,

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV. 3.

comparative example 3), it cannot constitute a special technical feature, and claims 1-3, 7, 9-15, claims 4-5 and claim 6 are considered to be separate inventions.

Accordingly, the claims as set forth in this international application describe four inventions classified as claims 1-3, 7, 9-15, claims 4-5, claim 6, and claim 8.

7.	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
	citations and explanations supporting such statement

1.	Statement			
	Novelty (N)	Claims		YES
	• • • • • • • • • • • • • • • • • • • •	Claims	1-15	NO
	Inventive step (IS)	Claims		YES
		Claims	1-15	NO
	Industrial applicability (IA)	Claims	1-15	YES
		Claims		NO

2. Citations and explanations

- Document 1: JP 2000-100453 A (Hitachi Chemical Co., Ltd.),
 7 April 2000 (Family: None)
- Document 2: JP 2000-82476 A (Hitachi Chemical Co., Ltd.), 21 March 2000 (Family: None)
- Document 3: JP 2000-182630 A (Nisshinbo Industries, Inc.),
 30 June 2000 & EP 1011164 A2 & US
 2002/0068210 A1
- Document 4: JP 2001-189159 A (Nisshinbo Industries, Inc.), 10 July 2001 & EP 1094534 A2
- Document 5: JP 2001-106831 A (Sumitomo Bakelite Co., Ltd.), 17 April 2001 (Family: None)
- Document 6: JP 8-222241 A (Tokai Carbon Co., Ltd.), 30
 August 1996 (Family: None)
- Document 7: JP 2000-348740 A (Ibiden Co., Ltd.), 15

 December 2000 (Family: None)
- Document 8: JP 11-354136 A (Hitachi Chemical Co., Ltd.), 24 December 1999 (Family: None)

The invention set forth in claims 1 to 7 and 9 to 15 lacks novelty and does not involve an inventive step in the light of document 1 cited in the international search report.

Document 1 indicates that exfoliated graphite powder

is pressed into a sheet using a roller, and the sheet thus obtained is crushed to obtain exfoliated graphite powder; and that the exfoliated graphite powder obtained is mixed with resin and molded using a molding die for fuel cells.

The fuel cell separator and its raw materials in the invention set forth in document 1 correspond to those set forth in claims 1 to 7 and 9 to 15, and the manufacturing method is similar, therefore it is understood that the flexural/fracture distortion, modulus of compressive elasticity and Shore hardness in the invention set forth in document 1 overlap with the range set forth in claims 1 to 6 in some cases.

The invention set forth in claim 8 lacks novelty and does not involve an inventive step in the light of document 1.

Document 1 indicates that exfoliated graphite powder is rinsed with water or heat-treated, and that a pad made from enamel is used (paragraph [0036]).

The fuel cell separator set forth in claim 8 and its method of manufacture are similar to those described in the invention set forth in document 1,, therefore it is understood that the total concentration of elutriated sodium, potassium, iron, nickel and magnesium in the immersion water, and the concentration of sulfur overlap with the range set forth in claim 8 in some cases.

The invention set forth in claims 1 to 7 and 9 to 15 lacks novelty and does not involve an inventive step in the light of document 2 cited in the international search report.

Document 2 indicates that exfoliated graphite powder is pressed into a sheet using a roller, and the sheet thus

obtained is crushed to obtain exfoliated graphite powder; and that the exfoliated graphite powder obtained is mixed with resin and a fibrous substance and molded using a molding die for fuel cells.

The fuel cell separator and the manufacturing method thereof set forth in claims 1 to 7 and 9 to 15 are similar to those described in document 1, and the manufacturing method is similar, therefore the flexural/fracture distortion, modulus of compressive elasticity and Shore hardness in the invention set forth in document 2 is understood to overlap with the range set forth in claims 1 to 6 in some cases.

The invention set forth in claims 1 to 7, 9 to 10 and 12 to 15 lacks novelty and does not involve an inventive step in the light of document 3 cited in the international search report.

Document 3 indicates that it is possible to obtain a high-strength, extremely tough fuel cell separator, and that the amount of deflection in bending is 0.5mm or more, bending strength falls within the range of 4 to 15kgf/mm², and the bending modulus of elasticity falls within the range of 2000 to 6000kgf/mm2 (paragraph [0036]).

It is understood that the flexural/fracture distortion, modulus of compressive elasticity and Shore hardness in the invention set forth in document 3 overlap with the range set forth in claims 1 to 6 in some cases.

The invention set forth in claim 11 does not involve an inventive step in the light of document 3 cited in the international search report.

Document 3 sets forth exfoliated graphite and the like as powdered carbon filler (paragraph [0019]), but the

use of powder obtained by crushing exfoliated graphite sheet as exfoliated graphite is known as set forth in documents 1 and 2, therefore it would be easy for a person skilled in the art to use powder obtained by crushing exfoliated graphite sheet as exfoliated graphite in the invention set forth in document 3.

The invention set forth in claims 1 to 7, 9 and 12 to 15 lacks novelty and does not involve an inventive step in the light of document 4.

Document 4 indicates that it is possible to obtain a fuel cell separator with a high bending strength and a low degree of bending elasticity (with a high amount of distortion) (paragraphs [0008] to [0009]).

It is understood that the flexural/fracture distortion, modulus of compressive elasticity and Shore hardness in the invention set forth in document 4 overlap with the range set forth in claims 1 to 6 in some cases.

The invention set forth in claims 1 to 7, 9 and 12 to 15 lacks novelty and does not involve an inventive step in the light of document 5 cited in the international search report.

Document 5 sets forth a conductive molded body having specific values for bending strength and amount of deflection in bending (paragraphs [0012] to [0015]).

It is understood that the flexural/fracture distortion, modulus of compressive elasticity and Shore hardness of the invention set forth in document 5 overlap with the range set forth in claims 1 to 6 in some cases.

The invention set forth in claims 6 to 7, 9 and 12 to 15 lacks novelty and does not involve an inventive step

in the light of document 6 cited in the international search report.

Document 6 sets forth a graphite member having a Shore hardness of 40 and used as a fuel cell separator or the like ([Table 2]).

The invention set forth in claims 8 to 9 and 12 to 15 lacks novelty and does not involve an inventive step in the light of document 7 cited in the international search report.

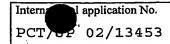
Document 7 sets forth a fuel cell separator having a concentration of impurities contained within a resin molded body of 100ppm or less. Document 7 also indicates that carbon powder is treated with halogens while being heated, and sets forth sodium, potassium, iron, nickel, magnesium and the like as impurities (paragraph [0026]).

In the invention set forth in document 7, it is understood that if sulfur is contained as an impurity, its concentration would be reduced.

The invention set forth in claims 10 to 11 does not involve an inventive step in the light of documents 7, 1 and 2 cited in the international search report.

The use of powder obtained by crushing exfoliated graphite sheet as the carbon powder used in fuel cell separators is known, as indicated in documents 1 and 2, and it would be easy for a person skilled in the art to use powder obtained by crushing exfoliated graphite sheet as the carbon powder in the invention set forth in document 7.

The invention set forth in claims 1 to 7 and 9 to 15

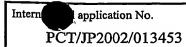


lacks novelty and does not involve an inventive step in the light of document 8 newly cited in the written opinion.

Document 8 indicates that exfoliated graphite powder is pressed into a sheet using a roller, and the sheet thus obtained is crushed to obtain exfoliated graphite powder; and that the exfoliated graphite powder obtained is mixed with resin and molded using a molding die for fuel cells.

The fuel cell separator and its raw materials in the invention set forth in document 8 correspond to those set forth in claims 1 to 7 and 9 to 15, and the manufacturing method is similar, therefore it is understood that the flexural/fracture distortion, modulus of compressive elasticity and Shore hardness in the invention set forth in document 8 overlap with the range set forth in claims 1 to 6 in some cases.

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rtain published documents	(Rule 70.10)			
Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	-	Priority date (valid claim (day/month/year)
JP 2002-184420 A	28 June 2002 (28.06.2002)	03 October 2001 (03.	10.2001)	03 October 2000 (03.10.
[E, X]				
JP 2002-198063 A	12 July 2002 (12.07.2002)	15 October 2001 (15.	10.2001)	18 October 2000 (18.10.
[E, X]				
n-written disclosures (Rul	~ 70 0)			
	•			of written disclosure
Kind of non-written		n-written disclosure Imonth/year)	referring to non-written disclosure (day/month/year)	